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CHANGING STRUCTURE, CONDUCT AND PERFORMANCE OF THE WORLD RICE MARKET

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A. LOWER WORLD RICE PRICES: ABSOLUTE AND RELATIVE

Surely the most important change in the world rice market during the past fifty years has been the dramatic decline in the level of prices adjusted for inflation (real prices). In 1950, the average world market price for top quality indica (e.g. Thai 100Bs, FOB Bangkok) was \$137 per ton in nominal terms. Today, in early 2004, the nominal price is about \$220 per ton, an increase of 61%. Yet, during those 53 years, the average price level, as measured by the United States (US) CPI, has increased by 666%! The net result is that, after adjusting for inflation, world rice prices today are 77% lower than the average from 1950-1981 (see Figure 1).¹ This is a remarkable achievement in the realm of food security, as it allows countries improved access to affordable supplies of food. Because the poorest Asians are landless rural dwellers who must purchase their daily rice, low food prices are important for poverty alleviation in Asia. Other important groups of poor people who benefit from the relatively cheap prices are small farmers who have insufficient land to produce a surplus for sale, farmers who grow crops other than rice (e.g. maize), and the urban poor.

Green Revolution & Cheaper Fertilizer. The main factor behind the decline in prices is, of course, the Green Revolution, which led to an increase in yield and a lowering of unit production costs. It also led to an expansion in harvested area due to multiple cropping, further increasing production. During the past half century, production in Asia increased from 125 kg paddy per capita in 1950 to 173 kg paddy per capita at its peak in 1999. Other than the new technology of modern varieties and irrigation, falling real prices for fertilizer also were important. At the dawn of the Green Revolution in 1967, world market urea prices were about \$400 per ton in current dollar terms, while during the past five years, they have averaged slightly less than \$100 per ton.

In Local Currencies. A decline in world market rice prices in terms of real US\$ does not necessarily translate into a decline in real domestic currency terms for individual countries. To the extent that the domestic currency undergoes a real depreciation against the US\$, this will erode the decline in the world rice price when translated into the domestic currency. During the past 20-25 years, nearly all Asian currencies (with the exception of the Japanese yen) have depreciated in real terms against the dollar. Nevertheless, this real depreciation has not been large enough to cancel the decline in world prices in \$ terms in any Asian nation. Figure 2 shows the percentage decline in world rice prices in real domestic currency terms for a number of Asian countries. The decline has been at least 50% in nearly all countries, with Indonesia the main exception, where it has only declined by 10%. In other words, the Indonesian rupiah has depreciated so strongly during the past 20-25 years that the world market price of rice, measured in terms of constant Indonesian rupiah, has declined only slightly.

¹ Results are similar when using different price deflators.

Compared To Other Grains. Although world prices for other major grains, i.e. wheat and maize, have also declined in real terms, the decline for rice has been larger. Thus, from 1965 to 1982, rice prices were on average 3.13 times as high as world maize prices, and 2.54 times as high as world wheat prices. From 1983 to 2000, these ratios declined to 2.45 and 1.87, respectively. And in the past three years, 2001 to 2003, the ratios fell even further, to 1.93 and 1.35. As such, the attractiveness of rice imports has improved relative to the other grains.

B. INCREASED STABILITY OF WORLD PRICES

Not only are world rice prices much lower than in years past, they are also much more stable. Dawe (2002) calculated that the average absolute value of annual price changes was 24% between 1965 and 1981, but just 11% between 1985 and 1998. A more sophisticated calculation using the root mean square error of a regression of the real price on a time trend divided by the average price gave similar results.

Increased Production Stability. One factor that has contributed to increased price stability has been increased stability of per capita production. In the decades of the 50s, 60s, and 70s, fluctuations in per capita production of $>\pm 3\%$ were relatively common, occurring 22 times in the 29 years from 1952 to 1980. Since then, fluctuations of this magnitude have occurred just six times in 22 years. The average absolute value of annual changes in per capita production was 4.4% from 1952 to 1964, 3.7% from 1965 to 1981, and only 1.6% from 1985 to 1998 (Dawe, 2002).

Increased production stability is due largely to irrigation and the pest and disease resistance of modern varieties. While irrigation is more expensive than in the past, the share of rice area irrigated increased from the late 1970s to the mid 1990s. This is primarily because large areas of upland (3 million ha) and deep-water rice (1.2 million ha) either went out of rice production or were converted to irrigated area between the late 1970s and the early to mid-1990s, constituting a 25 percent decline in the rice area under these ecosystems (Huke and Huke, 1997). In addition, irrigated rice area increased during these years at an average annual rate of about 0.9 percent per year, or about 600,000 hectares annually. Thus, while irrigated area comprised about 51 percent of total rice area in the late 1970s, it accounted for 55 percent of total rice area in the early to mid-1990s. Excluding China, where large areas of irrigated rice were lost during this period of time, the relative increase in irrigated area was more significant, rising from just 35 percent of total area in the late 1970s to 44 percent in the early to mid-1990s.

A deeper world market. Another contributing factor to the increased price stability is the pronounced deepening of the world market. Between 1961 and 1993, world rice trade fluctuated between 3 and 5% of world production, with an average of 4.3% (based on raw data from FAOSTAT). In the ten years since 1994, however, the ratio has exceeded 5% every single year, with the share traded averaging 6.3%. In terms of tonnage traded, average world trade increased from an average of 13.5 million tons (milled rice) between 1984 to 1993 to an average of 23.9 million tons between 1994 and 2003, a near doubling of the market.

The deepening of the world rice market has been broad-based in terms of countries and regions, although Asia (excluding the Middle East) increased its share of both exports and imports in recent years. On the export side, Vietnam has played a key role in adding depth to the market. Other large increases have come from India, Thailand, China, and Pakistan. On the import side,

much of Asia “rediscovered the law of comparative advantage (Slayton, 1999)” as yield growth slowed to nearly zero in countries like Indonesia and the Philippines and forced additional imports in order to contain pressure on domestic prices in the face of increased demand driven by population growth. In the case of Japan, increased imports were driven by WTO commitments. (Despite this recent increase in its’ share of world rice imports, Asia remains much less dominant than it was in the 1960s, as described in the next section). Imports by Africa, the Middle East, and Latin America and the Caribbean also increased between the two periods.

The role of market stabilizers. A third contributing factor to the increased stability is the commercial orientation of several major exporters. During the 1950s, prices were relatively stable despite large instability in production. Dawe (2002) argues that this was due to the commercial orientation (defined as a large share of exports in domestic production) of several major exporters, in particular Myanmar (then known as Burma), Cambodia, and Thailand. The reliance of their rice economies on exports at this time encouraged them to export even at the expense of allowing domestic prices to rise, and their exports reduced the price fluctuations due to the El Niño and La Niña events of that decade. By the mid 1960s to 1970s, however, rice exports had become a smaller share of domestic production for all of these countries. In this situation, domestic considerations became paramount, and led to the tremendous price instability that existed from 1965 to 1981. Today, however, Thailand’s rice economy is once again dependent on exports (about 40% of domestic production), and Vietnam has emerged to complement Thailand as a consistent large exporter.

The renewed commercial orientation of Thailand was brought home during the major El Niño event of 1998, which caused a large production shortfall in Indonesia (Naylor et al, 2001) and resulted in the import of more than 6 million tons by some estimates. At the same time, the Thai baht had depreciated substantially due to the Asian financial crisis, and domestic rice prices surged 50% in Thailand in the span of just two months. During the world food crisis of the 1970s, the response of Thailand to increased domestic prices was an export ban, creating fears of rice shortfalls around Asia. But in 1998, Thailand continued to supply the world market and exported a then record of 6.5 million tons (Dawe, 2002).

China and India, with large stocks in the hands of their governments, also played key roles as market stabilizers in 1998, especially in the low-grade markets. Short-term increases in world prices during this time became quite attractive, and were capped by increased shipments from both countries. China increased its exports by nearly 3 million tons and supplied a large part of Indonesia’s needs at this time, while India increased its exports by even more, shipping much of the increase to Bangladesh and Africa. These types of responses were exactly how world markets behaved in the 1950s – fortunately, the period of price instability from 1965 to 1981 seems to have been an exception, not the rule.²

C. NEW IMPORTERS & REDUCED DOMINANCE OF ASIA

From 1961 to 1972, in the years before OPEC and before the Green Revolution began to spread widely, Asia (excluding the Middle East) accounted for 64% of world rice imports, and an identical share of world exports. Today, however, rice imports come from a much more

² China also played a market stabilization role during the world food crisis of the early 1970s, serving as the world’s largest rice exporter in 1973 and 1974.

diversified group of countries. While Asia's share of world rice exports now stands at about 72% (1996 to 2002), its share of imports has declined to just 32%.

The primary reason for Asia's relative decline on the import side was a strong increase in demand from the Middle East and Africa, with Latin America and the Caribbean also increasing its share to a more limited extent. The Middle East, with its economies enriched by increased oil revenues and attracting an influx of foreign workers, boosted its rice imports, and its share of world rice imports increased from 5% to 18% between the two periods. Africa increased its share of world imports from 9% to 22%, while Latin America and the Caribbean increased its share from 5% to 12%.

This diversification of world rice imports is reflected in the share of world imports accounted for by the top ten importers in any given year. In the 1960s, this share was about 65%, but today it has dropped to only 40%. In contrast, the top ten exporters have consistently accounted for about 90% of world exports during the past 40 years.

In general, both population growth and an increased share of rice in total calories have driven the increased imports in African countries. For example, rice accounted for just 2% of caloric intake in Nigeria in the late 1960s, but this share increased to 9% in the late 1990s. Even larger increases occurred in Mauritania and Mali, where rice now accounts for more than one-fifth of calories today compared to less than 10% in the late 1960s. Large increases in the dietary importance of rice have also occurred in Senegal, Cote d'Ivoire, Guinea and Guinea-Bissau. In the Middle East, however, e.g. Saudi Arabia and Iran, the increased imports have mainly been driven by increased population growth, with the share of rice in caloric intake being little different today than before OPEC. There has been a small increase in the share of rice in calories in Iraq, but not as large as in many African countries.

D. NEW ACTORS & POLICIES: IS THE ROLE OF GOVERNMENT CHANGING?

The dominance of governments in the international rice trade is much less today than in the late 1970s (Slayton, 1999), although the magnitude of this change is difficult to quantify precisely. Slayton (1999) estimated that, from 1995 to 1999, government to government (G to G) contracts, including food aid, averaged less than 7% of world rice trade. Slayton (1999) also estimated that 1.9 million tons of exports from Thailand, Pakistan, and Myanmar (then Burma) were under G to G contracts in 1980. If we add in 0.5 million tons of food aid from the USA in that year (USDA, 2003), then total G to G contracts were at least 2.4 million tons in 1980, or a minimum of 19% of world trade at that time. As the role of government in the international rice trade has diminished, so has the influence of large trading companies. Today, there are a larger number of smaller trading companies, which has increased competition and eroded trading margins (Slayton, 1999).

Although the longer-term trend toward a reduced role for government in the international rice trade is unmistakable, it is not clear if this trend will continue or in fact be reversed. Indonesia and Thailand, the world's largest importer and exporter, respectively, provide interesting examples.

For many years, Bulog had a monopoly on Indonesian international rice trade, with decisions on import quantities being made ultimately by President Suharto (Timmer, 1996). Beginning in

1999, Indonesia allowed the private sector to import rice subject only to a tariff of 430 Indonesian rupiah per kg. For the past several years, the private sector has been responsible for about three-fourths of Indonesia's imports. More recently, however, the government instituted a temporary import ban (to coincide with the main harvest), and has also issued a decree that will allow only specially licensed importers to import rice (previously, only a general import license was required). It is unclear if tariffs will increase in the future or how restrictive the licensing procedures will be, and how these developments will affect the role played by private traders.

Thailand began the process of liberalizing its international rice trade much earlier, with the role of G to G contracts generally diminishing over the past 25 years (Slayton, 1999), and taxation of rice exports being effectively abandoned by 1976 (Sriprasert, 2003). Until recently, however, there has been a resurgence of government intervention through implementation of an elevated floor price, leading to a build up of stocks in government hands unprecedented in the past quarter century (Sriprasert, 2003). But in the past few months, the majority of these stocks have been liquidated, and the new commerce minister has signaled that the government will not take on the role of competing with the kingdom's private exporters.

State owned enterprises (SOEs) still play an important role in Vietnam's international rice trade, but gradual liberalization is occurring (Tolentino, 2003). Initially, only a small number of SOEs were allowed to export, but the numbers have since been increased substantially. Furthermore, until recently, all rice exports were conducted by SOEs, but gradually private firms have been allowed to participate. Also, the government frequently tried to enforce Minimum Export Prices in the past, but this is less common today. There is now much less "central direction" to the country's exporters.

Bangladesh liberalized its international rice trade in 1994, allowing the private sector to import. This liberalization was coupled with complementary measures to expedite customs procedures and avoid re-imposition of anti-hoarding laws. In response to the massive floods of 1998, the private sector imported 2.4 million tons of rice between July 1998 and April 1999. These imports stabilized domestic prices and averted a food crisis (del Ninno and Dorosh, 2001). The private sector is still allowed to import rice, although the magnitude of the tariff and the banking requirements vary from time to time. Elsewhere in South Asia, Pakistan fully privatized rice exports in 1996, removing the monopoly formerly enjoyed by the Rice Export Corporation. Sri Lanka allows private sector imports of rice (Slayton, 1999).

Other Asian countries have liberalized much less. Exports from China are still only in the hands of state-owned companies. The government of India still makes the key decisions that determine the quantity of exports that occur (even if the private sector negotiates the sales and handles the actual exporting). The Philippine government still strictly controls the overall import volume, with the result that domestic wholesale prices are often double what they would be if unrestricted private sector imports were allowed (Dawe, 2003). Farmers and other private sector importers are allowed to carry out some of the imports, but the government still has full authority over the quantity to be imported, who receives licenses, and the procedures that must be followed. Japan, Korea, and Taiwan have all increased their level of imports as part of the WTO negotiations, but protection in these countries is still extraordinarily high as the government effectively controls the quantity of imports through very high tariffs or quotas (Cramer et al, 1999).

The role of governments in international rice trade has also generally been declining outside of Asia. Nigeria had a ban on rice imports from 1985 to 1994, but since then has replaced this ban with a tariff that has varied between 50 and 100% (Akande, 2002). Senegal and Cote d'Ivoire

privatized trade in 1995 and 1997, respectively (Slayton, 1999). In Latin America, governments have ceased to buy rice directly, instead using tariffs to regulate the volume of imports (Slayton, 1999).

E. TRENDS IN QUALITY

Price differentials for quality are narrowing. With rising income levels and increased market liberalization, there has been a pronounced shift from low quality (defined as more than 20% broken) to high quality (defined as less than or equal to 20% broken) during the past 25 to 30 years. In the mid 1970s, low quality comprised 38% of the world trade (Prakash, 2004), but that percentage declined to just 25% in 1998-99. After the devaluation of the baht in 1997, the relative share of low quality rice is similar in Thailand (1998-2000), the world's leading exporter, where it accounts for 32% of white long grain rice exports (excluding parboiled and glutinous rice).

During the past 15 years, the price differential for higher quality has narrowed substantially. For example, in 1990, Thai 100B commanded a premium of \$176 per ton (constant 2003 dollars) relative to A1 Special (Figure 3). During the past three years, however, this differential has averaged about \$50 per ton. Similar trends are evident for comparisons of other qualities. Since the demand for high quality rice has increased over time, the narrower price differential reflects increased competition from Vietnam in this segment of the market, as well as improved milling and other technologies that are able to produce high quality rice on a more cost-effective basis.

While this price differential has been narrowing over time, the prices for different qualities today appear to be less integrated than in earlier years. In other words, a given monthly percentage change in the price of 100B is able to predict the concurrent monthly percentage change in the price of A1 Special much less accurately today than 15 years ago. Using monthly data on Bangkok prices from 1986 to 1990 (source of raw data is USDA), a regression of the first difference of the price of A1 Special on the first difference of the price of 100B (in log terms) yielded an adjusted R^2 of 0.57. Similar regressions were computed on a rolling five year basis, and from 1999 to 2003, the adjusted R^2 was just 0.22.³ One possible interpretation of this result is that as the price differential between high and low quality has narrowed, consumers are increasingly trading up. The increased reluctance to accept low quality rice as a substitute for high quality rice means that prices thus move more independently.

Paddy trade is growing in importance. In the early 1960s, paddy exports (on a milled equivalent basis) accounted for about 5% of total world trade. This was accounted for almost entirely by exports from Nepal to India. After a long period where it accounted for about 2% of world trade, it has increased its share to 4 or 5% once again. Today, it is primarily exports from the United States to Latin American countries. Although it is more costly to ship paddy because of the expense of transporting the lower-valued hulls and the extra space required, this trade is driven by a structure of import tariffs in Latin America designed to encourage local milling and, to a lesser extent, possibly by higher milling costs in the US.

As recently as 1992, paddy accounted for less than 5% of US exports. This share has increased steadily since then, however, reaching a peak of 36% in 1998 and averaging 29% from 2000 to

³ The first difference of the logarithm of prices was stationary for both qualities. Other details of the estimation are available upon request.

2002 (raw data from FAOSTAT). The increasing share of paddy in US rice exports appears to have increased fragmentation between US and Thai export prices as it contributes to higher local prices for rough rice. Using a procedure similar to that mentioned above, the monthly percentage change (first difference of the logarithm of price) in the price of Thai 100B was regressed on the monthly percentage change in the price of US#2/4% for successive five year rolling periods. For the regressions covering 1985-1989 up until 1993-1997, the average adjusted R^2 was 0.35. Beginning in 1994, however, paddy exports reached 11% of total US rice exports for the first time, and have increased much more since then. As a result, for the regressions covering 1994-1998 up until 1999-2003, the average adjusted R^2 declined to just 0.03. Thus, in recent years, changes in the price of US#2/4% have been almost completely disconnected from changes in the price of Thai 100B.

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